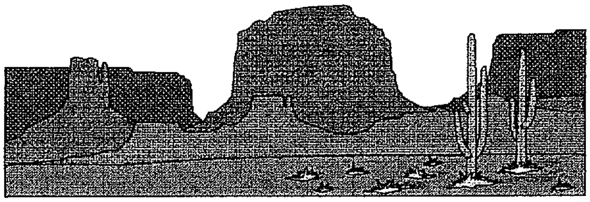
FACILITY INVENTORY



DOUGLAS MUNICIPAL AIRPORT MASTER PLAN

CHAPTER II: FACILITY INVENTORY

2.0 INTRODUCTION

The history of the Douglas Municipal Airport begins as early as 1928, when it was established as an International airport through a concerted effort by Cochise County and the City of Douglas. Airline service began the following year by Standard Air (now American Airlines). The same year, several Army aircraft were based at the field during the Escobar Rebellion to engage in border patrol activities. In 1930, Douglas Municipal Airport became a stop for the first transcontinental airmail route. Today, the airport is owned and maintained by the City of Douglas.

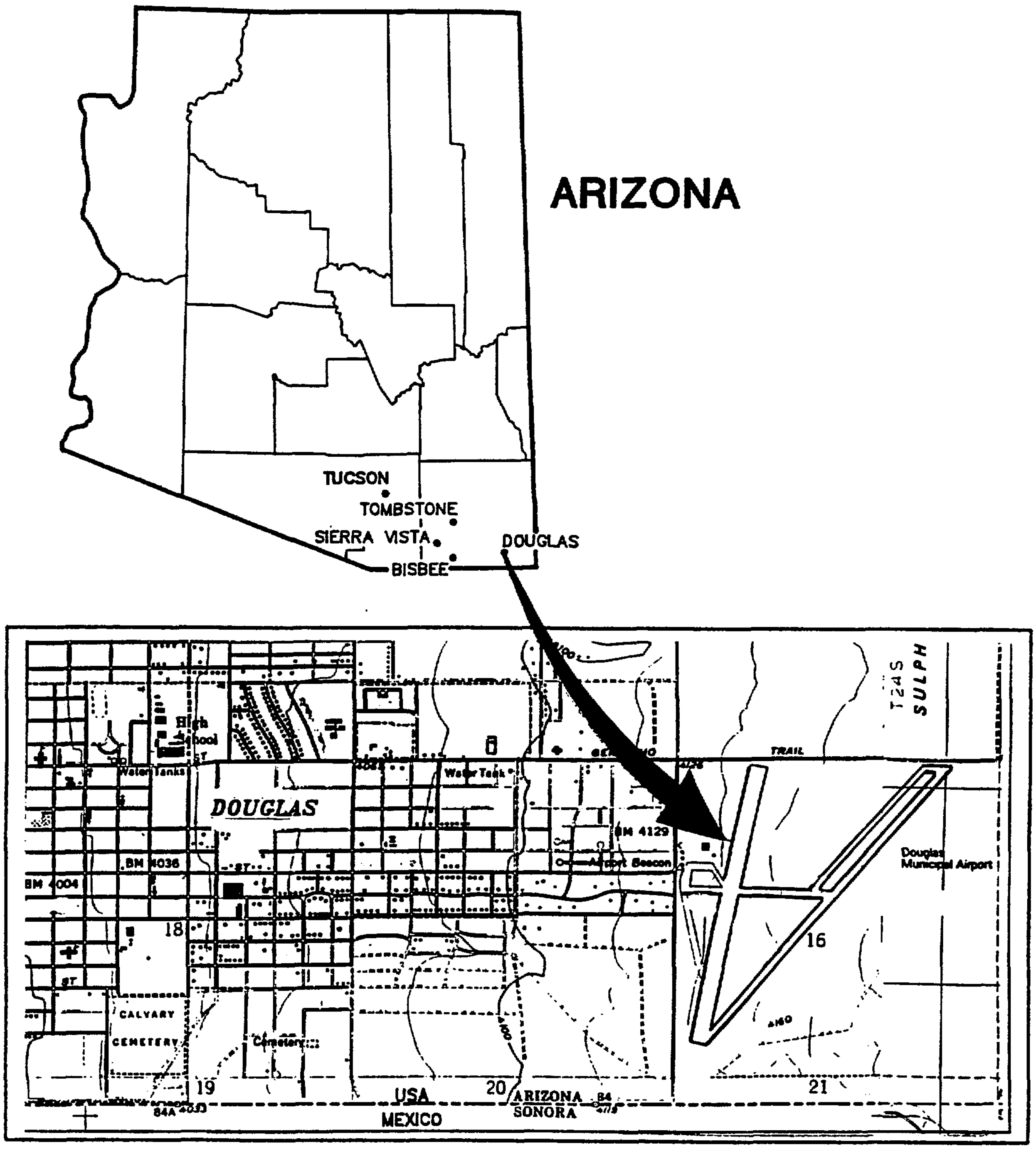
2.1 EXISTING AIRPORT CHARACTERISTICS

2.1.1 Location

Douglas Municipal Airport is located in the Southeastern portion of Arizona in Cochise County. The airport is located within the Douglas city limits, approximately 2 miles east of the Central Business District. The airport property is also adjacent to the United States/Mexico border on the south side. Figure 2-1 provides a graphic depiction of the location of this airport.

The Douglas Municipal Airport property contains approximately 640 acres, encompassing all of Section 16, Township 24 South, Range 28 East of the Gila and Salt River Meridian. Douglas Municipal Airport is designated by the FAA as Site Number 00670.A and is a public airfield. The airport location is N 31 °20' 33.37" latitude and W 109° 30' 23.24" longitude (estimated), according to FAA Form 5010-1, Airport Master Record. Douglas Municipal Airport is historically known as the first airport in the United States to have international status.

FIGURE 2-1
LOCATION MAP
DOUGLAS MUNICIPAL AIRPORT



2.1.2 Topography

Douglas Municipal Airport is at an elevation of 4,173 feet Mean Sea Level (MSL). Topography of the surrounding area ranges from mountains to desert plains. To the east and northeast of the Douglas Municipal Airport are mountains ranging from 8,565 feet MSL to 9,759 feet MSL.

2.2 AIRPORT REFERENCE CODE

The Airport Reference Code (ARC) is a system established by the FAA which is used to relate airport design criteria to the operational and physical characteristics of the aircraft intended to operate at the airport. The ARC has two components relating to the airport design aircraft. The first component, depicted by a letter, is the aircraft approach category and relates to aircraft approach speed (operational characteristic). The second component, depicted by a Roman numeral, is the aircraft design group and relates to aircraft wingspan (physical characteristic). Generally, aircraft approach speed applies to runways and runway related facilities. Aircraft wingspan is primarily related to separation criteria involving taxiways and taxilanes. Table II-1 has been included to provide a definition of both Aircraft Approach Categories and Aircraft Design Groups.

TABLE II-1
AIRCRAFT APPROACH CATEGORIES & DESIGN GROUPS

AIRCRAFT APPROACH CATEGORY: An aircraft approach category is a grouping of aircraft based on an approach speed of 1.3 times the stall speed of the aircraft at the maximum certified landing weight.

Aircraft Category	Approach Speed
Category A	Speed less than 91 knots
Category B	91 knots or more but less than 121 knots
Category C	121 knots or more but less than 141 knots
Category D	141 knots or more but less than 166 knots
Category E	166 knots or more

AIRCRAFT DESIGN GROUP: The aircraft design group subdivides aircraft by wingspan. The aircraft design group concept links an airport's dimensional standards to aircraft approach categories or to aircraft design groups or to runway instrumentation configurations. The aircraft design groups are:

Design Group	Aircraft Wingspan
Group I	Up to but not including 49 feet
Group II	49 feet up to but not including 79 feet
Group III	79 feet up to but not including 118 feet
Group IV	118 feet up to but not including 171 feet
Group V	171 feet up to but not including 214 feet
Group VI	214 feet up to but not including 262 feet

To designate an ARC for the Douglas Municipal Airport, aircraft in the specific category must have a minimum of 500 annual operations per year. Therefore, an evaluation of current aircraft using the airport was made. A list of these aircraft types along with their specific ARC are listed in Table II-2. At Douglas Municipal Airport, the aircraft types which use Runway 3/21 and have a minimum of 500 operations annually are those aircraft within the ARC of B-II weighing 12,500 pounds or less. As recommended development occurs, such as the establishment of a nonprecision approach, the design aircraft group is expected to increase to a B-II weighing less than 25,000 pounds for Runway 3/21. This is expected to occur within the 15 to 20 year time frame. Runway 18/36's design aircraft group are those aircraft having an ARC of B-I. Table II-3 provides example aircraft which fall into the A-I & B-I and A-II & B-II Airport Reference Codes. The maximum certified takeoff weight for each representative aircraft has also been included as a reference to the aircraft classification system.

TABLE II-2
AIRCRAFT USING DOUGLAS MUNICIPAL AIRPORT

AIRCRAFT TYPE	AIRCRAFT OWNER/SPONSOR	AIRPORT REFERENCE CODE
Cessna 310	Private Owner	A-I
Cessna 210	Private Owner	A-I
Cessna 421	Private Owner	B-I
Beechcraft 35	Arizona Travel Service	A-I
Cessna Citation II	Factory to You	B-II
Cessna 441	Air Care - University Medical Center, Tucson	B-II
Gates Learjet 25 and 35	Mountain Industries, El Paso	C-I D-I
Beech King Air 100	Ueta, San Antonio	B-I
Beech King Air E90	U.S. Customs, Tucson	B-II
Rockwell Turbo Commander	State of Arizona	B-I
C12	Army National Guard, Phoenix	B-I

2.3 AIRSIDE CHARACTERISTICS

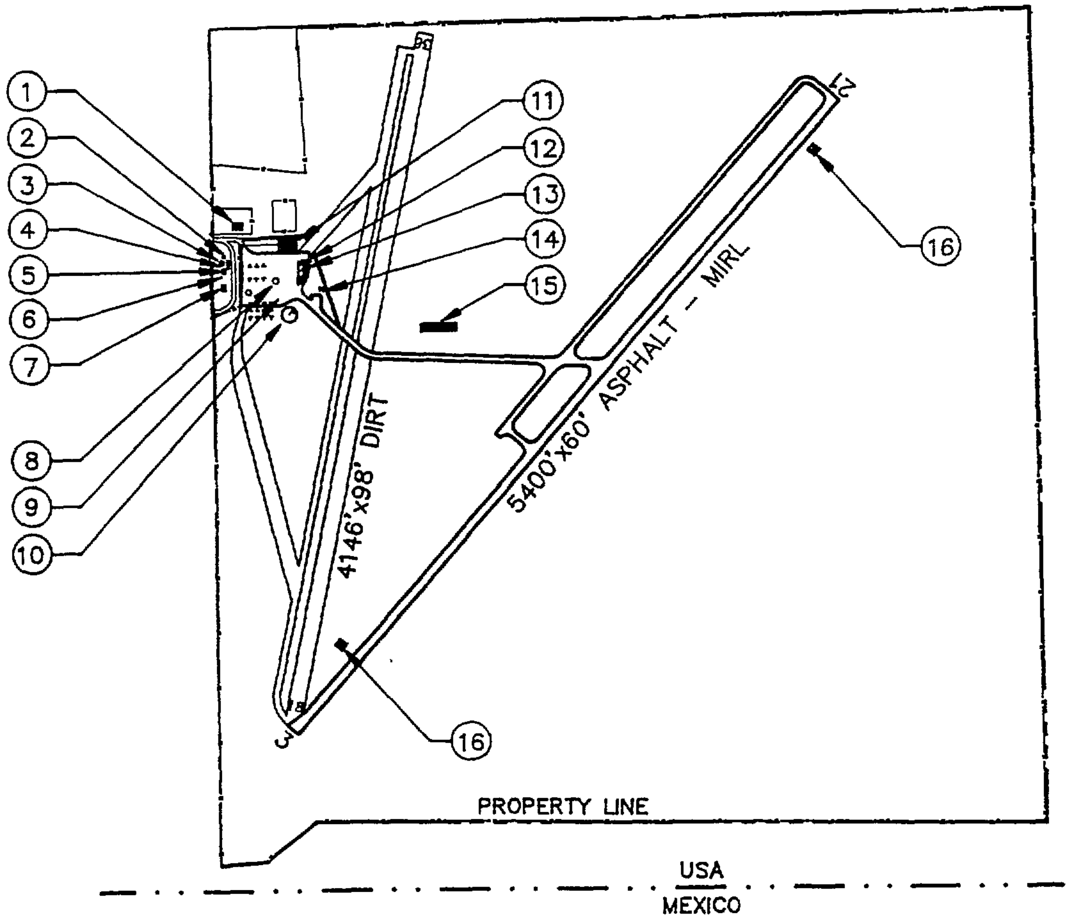
The airside facilities of an airport are described as the runway configuration, the associated taxiway system, the ramp and aircraft parking area, and any visual or electronic approach navigational aids. Figure 2-2 provides a drawing showing the existing facilities and layout of Douglas Municipal Airport.

TABLE II-3
ARC & AIRCRAFT CLASSIFICATION
EXAMPLE AIRCRAFT

EXAMPLE AIRCRAFT HAVING AN ARC OF A-I OR B-I			
Aircraft	**Approach Speed (Knots)**	**Wingspan (Feet)**	**Max. T.O. Weight (Pounds)**
Beech Baron 58P	101	37.8	6,200
Beech Bonanza V35B	70	33.5	3,400
Beech King Air B100	111	45.9	11,799
Cessna 150	55	33.3	1,670
Cessna 421	96	41.1	7,500
Cessna Citation I	108	47.1	11,850
Gates Learjet 28/29	120	42.2	15,000
Mitsubishi MU-2	119	39.1	10,800
Piper Archer II	86	35.0	2,500
Piper Cheyenne	110	47.6	12,050
Rockwell Sabre 40	120	44.4	18,650
Swearingen Merlin	105	46.3	12,500
EXAMPLE AIRCRAFT HAVING AN ARC OF A-II OR B-II			
Aircraft	**Approach Speed (Knots)**	**Wingspan (Feet)**	**Max. T.O. Weight (Pounds)**
Beech King C90-1	100	50.3	9,650
Beech Super King Air	103	54.5	12,500
Beech 1900	120	54.5	15,245
Cessna 441	100	49.3	9,925
Cessna Citation II	108	51.6	13,300
Dassault Falcon-50	113	61.9	37,480
Grumman Gulfstream I	113	78.5	35,100

Source : AC 150/5300-13, Airport Design

FIGURE 2-2
EXISTING AIRPORT FACILITIES
DOUGLAS MUNICIPAL AIRPORT



FACILITIES LIST

1. AIR MUSEUM
2. SHED
3. BEACON
4. TRAILER/FBO
5. OFFICE BLDG.
6. SHED
7. HOUSE
8. 100 LL FUEL PUMP
9. AIRCRAFT PARKING APRON
10. SEGMENTED CIRCLE
11. CONVENTIONAL HANGAR
12. STORAGE BUILDING
13. CONVENTIONAL HANGAR
14. FUEL TANKS/JET A FUEL PUMP
15. T–HANGARS
16. PAPI

2.3.1 Runways

Douglas Municipal Airport currently has two runways available for use. The primary Runway 3/21 is 5,400 feet in length and 60 feet wide. It is constructed of asphalt, and the strength of the runway pavement is 6,000 pounds Single Wheel Gear (SWG), according to the Arizona Aviation System Plan Inventory. The runway also has a 600 foot dirt overrun at the approach end of Runway 21, and a 200 foot dirt overrun at the approach end of Runway 3. The runway has basic markings that are in good condition.

Runway 18/36 is the crosswind runway at Douglas Municipal Airport. It is a dirt runway in poor condition, and is 4,146 feet long and 98 feet wide. The runway is essentially unusable, due to the lack of adequate safety area grading along the sides of the runway.

2.3.2 Taxiways

Runway 3/21 has a partial parallel taxiway extending from the approach end of Runway 21 approximately 3,070 feet. The taxiway is 35 feet wide and the centerline is located approximately 240 feet from the runway centerline. The taxiway pavement is in good condition, but the strength of the pavement is not known. An additional taxiway at Douglas Municipal Airport extends from the partial parallel taxiway of Runway 3/21 to the west and leads to the aircraft parking apron. This taxiway intersects the dirt crosswind runway, but the hold line markings for this intersection were covered by the last overlay project. Both of these taxiways are equipped with Medium Intensity Taxiway Lights (MITLs).

Runway 18/36 has a full length dirt parallel taxiway that is approximately 50 feet wide and is in poor condition. Three stub taxiways connect Runway 18/36 and it's parallel taxiway.

2.3.3 Aircraft Apron

The aircraft parking apron at Douglas Municipal Airport has approximately 15,000 square yards (SY) of area. The apron contains 10 aircraft tiedowns, while eleven additional tiedowns are located adjacent to the apron in the grass or dirt. The apron pavement is in fair condition, and the strength of it is not known. The apron is also lighted.

2.3.4 Navaids and Radar Coverage

Services provided by FAA operated facilities include Albuquerque En Route Center and Prescott Flight Service Station (FSS). Enroute and radar coverage for the Douglas area is provided by the Albuquerque En Route Center. The altitude of radar coverage may vary as a result of the FAA navigational/radar facilities in operation, weather conditions, and terrain which surrounds Douglas. The Prescott FSS provides additional weather data and other pertinent information to pilots on the ground and enroute. Pilots contact the Prescott FSS on radio frequency 122.6 or the Tucson FSS on 122.4.

2.3.5 Airfield Lighting

The airport has a standard rotating beacon and Runway 3/21 is equipped with pilot controlled Medium Intensity Runway Lights (MIRL). The MIRL's can be controlled by the clicks of the pilot's microphone while the radio is set on frequency 122.8 (three clicks for low intensity, five clicks for medium intensity, and seven clicks for high intensity), and stay activated for fifteen minutes. The Precision Approach Path Indicators (PAPIs) for Runway 3/21 are also pilot controlled, and are activated with five clicks of the aircraft microphone. Runway 18/36 is equipped with nonstandard Low Intensity Runway Lights (LIRL), which are currently not operational. The connecting taxiways to Runway 18/36 are also lined with retroreflective markers. As mentioned earlier, the parallel taxiway to Runway 3/21 and the taxiway leading to the aircraft apron are equipped with Medium Intensity Taxiway Lights (MITLs).

2.4 LANDSIDE CHARACTERISTICS

Landside characteristics of an airport are described as those facilities not included as airside characteristics. Examples of landside facilities are any structures adjoining the airfield, the access routes to and from the facility, terminal buildings, and auto parking areas.

2.4.1 Airport Buildings

Several buildings are located on the Douglas Municipal Airport property (refer to Figure 2-2). The airport has two conventional hangars next to the aircraft parking apron, ten T-hangars between Runway 18/36 and Runway 3/21's parallel taxiway, an FBO office, an additional office/pilot's lounge/restroom, two storage sheds, a house, and an air museum.

2.4.2 Airport Services

The Douglas Municipal Airport is attended by an airport manager Monday through Friday from 7:00 a.m. until 6:00 p.m., and on

Saturday and Sunday from 8:00 a.m. until 5:00 p.m. The airport Unicom frequency is 122.8 for airport advisories. A Fixed Base Operator (FBO), Air Resources International, is also located on the airport, and has a lounge and aviation supplies for local and transient pilots. The FBO hours coincide with airport hours. The FBO offers major and minor aircraft repair, pilot training, and fuel sales.

2.4.3 Fuel Facilities

The Douglas Municipal Airport has two 12,000 gallon above ground fuel tanks which contain 100 LL (low lead) and Jet A aviation fuel. The tanks rest on a cement pad and are surrounded by a 24 inch high retaining wall. The 100 LL fuel is dispensed from a pump located in the middle of the aircraft apron. The Jet A fuel is dispensed either from a pump located near the fuel tanks or via a fuel truck.

2.4.4 Airport Access

The nearest Interstate which provides access to the Douglas Municipal Airport is Interstate 10. I-10 east from Tucson or west from Lordsburg, New Mexico, leads to Arizona State Highway 80 at the Benson exit. State Highway 80 south will take the driver directly to Douglas. In Douglas, 10th Street east leads straight to the Douglas Municipal Airport.

2.4.5 Airport Fencing

The Douglas Municipal Airport currently has a four foot barbed wire fence which encompasses the airport property. The fence is in good condition.

2.5 AIRSPACE CHARACTERISTICS

2.5.1 Area Airports/Service Area

The Douglas Municipal Airport is one of eight airports in Cochise County. As demonstrated in the 1994 Cochise County Airport System Plan, each of these airports has a very specific service area. The surrounding general aviation airports in the United States within a 50 nautical mile (NM) radius of Douglas Municipal Airport include Bisbee-Douglas International Airport, approximately 10 NM northwest, Cochise College Airport, approximately 10 NM west, Bisbee Airport, approximately 19 NM west, Sierra Vista Municipal/Libby AAF, approximately 46 NM west-northwest, Tombstone Airport, approximately 33 NM northwest, Thompson International Airport (private), approximately 30 NM northwest, and Whetstone (private), approximately 46 NM northwest. Other airports within Cochise County include Benson (private), approximately 54 NM northwest, Cochise County, approximately 57 NM north-northwest, and Bowie, approximately 60 NM north. The airports within a 50 NM radius of Douglas Municipal Airport that are located in Mexico are listed in Table II-4. Figure 2-3 shows the service area of Douglas Municipal Airport.

TABLE II-4
AIRPORTS WITHIN 50 NAUTICAL MILES OF DOUGLAS MUNICIPAL AIRPORT IN MEXICO

AIRPORT	DISTANCE FROM DOUGLAS MUNICIPAL AIRPORT IN NAUTICAL MILES (NM)
Agua Prieta South	8 NM Southwest
Agua Prieta Southeast	3 NM Southwest
Hacienda San Francisco	44 NM East
Las Lanches	44 NM South-Southeast
Rancho El Mojon	28 NM Southeast
Fronteras West	28 NM South
Rancho San Joaquin	41 NM Southwest
Rancho El Mezquite North	42 NM Southwest
Cananea	44 NM Southwest
Rancho El Corral De Emmedio	47 NM West
Naco	23 NM West

2.5.2 Special Use Airspace/Military Operations Areas (MOAs)

Figure 2-4 is a depiction of the airspace overlying the Douglas Municipal Airport. The airspace contains the Tombstone A, B, and C Military Operations Areas (MOAs), and to the west is a Restricted Area, R-2303A. Victor Route 66 extends to the east and west from the Douglas VORTAC, which is located near the Bisbee-Douglas International Airport.

2.6 AIRCRAFT RESCUE AND FIRE FIGHTING (ARFF)

2.6.1 Fire Fighting

The Douglas Fire Department currently has three fire engines. The first engine has a 1,000 gallon tank with a 1,250 gallon per minute (GPM) pump, the second engine has a 500 gallon tank with a 1,000 GPM pump, and the third engine has a 500 gallon tank

FIGURE 2-3
SERVICE AREA
DOUGLAS MUNICIPAL AIRPORT

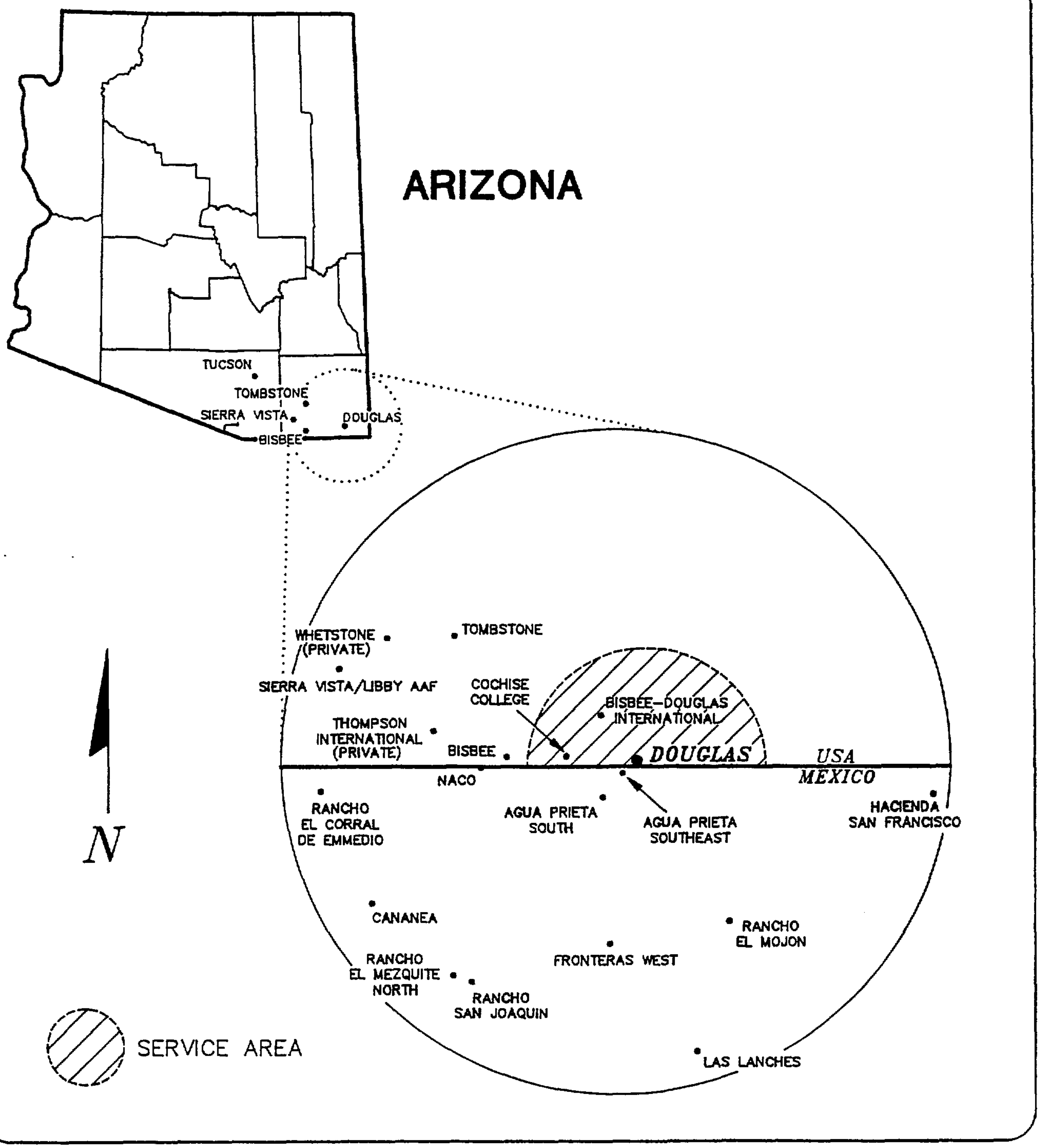
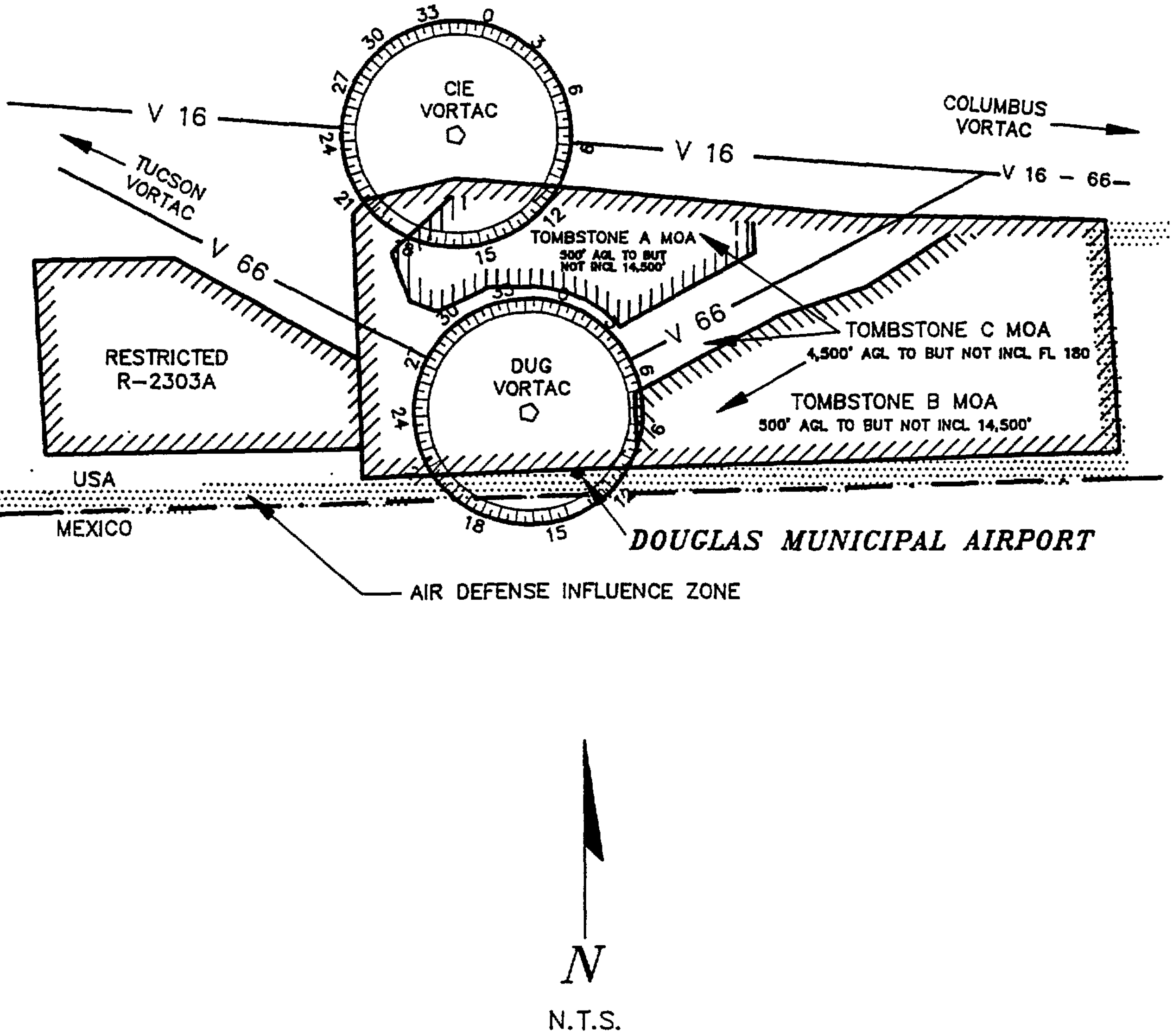


FIGURE 2-4
SPECIAL USE AIRSPACE/MOA'S
DOUGLAS MUNICIPAL AIRPORT



a 1,000 GPM pump, and the third engine has a 500 gallon tank with a 1,250 GPM pump. Each fire engine has foam capability, and the Douglas Fire Department offers foam fighting training. The Douglas Fire Department currently has 22 paid employees, with a minimum of 5 fire fighters on staff at all times. The response time to the Douglas Municipal Airport for the fire department is approximately 3 to 4 minutes.

2.6.2 Ambulance Service

The Douglas Ambulance Service has eight paramedics on staff. The service has one hydraulic rescue unit and one paramedic unit, and response time to the Douglas Municipal Airport is approximately 3 to 4 minutes.

2.6.3 Law Enforcement

The Douglas Police Department currently has 36 employed police officers, with 4 to 6 officers on duty throughout a 24-hour period. Each officer has his own patrol vehicle. The average response time for the Douglas Police Department to a call is just under six minutes. However, if an emergency call was made from the Douglas Municipal Airport and an officer was at the police station, response time to the airport would be approximately two minutes.

2.7 METEOROLOGICAL CONDITIONS

Meteorological conditions have a direct impact on the operational characteristics of an airport. These conditions determine the directions in which aircraft operations may be conducted, the frequency of use for each operational configuration, and the instrumentation required to assist aircraft in landing and departing.

2.7.1 Local Climatological Data

Douglas Municipal Airport has an elevation of 4,173 feet Mean Sea Level and moderate year-round temperatures. The mean maximum temperature for Douglas is 93.9°F, and the mean annual precipitation for the area is 13.05 inches.

Density Altitude: An extremely important meteorological factor to pilots is density altitude. Density altitude is not a height reference. Rather, it is used as an index of aircraft performance.

Air density is determined by air pressure, temperature, and humidity. As you increase altitude, the air density decreases.

However, air density also decreases with high temperatures and high humidity. This means that high altitudes or conditions of high temperature or humidity cause the air to be thinner than at lower altitudes, temperatures, or humidities. The combination of high temperatures, high humidity, and increased altitude result in an increasing high density altitude condition. High density altitude reduces performance in all types of aircraft.

The results of a high density altitude include increased takeoff and landing rolls and a reduced rate of climb. Density altitude is most dangerous when other contributing factors are involved, such as heavy loads, calm winds, short runways, unfavorable runway conditions, and obstructions near the end of the runway. Density altitude is a concern at the Douglas Municipal Airport, given its high temperatures in the summer, short runways, and surrounding rising terrain. Runway length is one factor of density altitude that can be controlled.

2.7.2 Ceiling and Visibility Conditions

Ceiling and visibility conditions at the Douglas Municipal Airport are important considerations since the occurrence of low ceiling and/or poor visibility conditions limit the use of the airport to instrument approach and departure operations until conditions change. Under poor visibility conditions or Instrument Meteorological Conditions (IMC), the pilot must operate under Instrument Flight Rules (IFR), rather than Visual Flight Rules (VFR). Under Instrument Meteorological Conditions, the pilot maneuvers the aircraft through reference to instruments in the aircraft and navigational aids on the ground. The airport must be closed for use when conditions are worse than the published IFR minimums for that airport. When flight conditions are VFR, the pilot can maneuver the aircraft by reference to the horizon and objects on the ground.

Douglas Municipal Airport only has visual approaches and subsequently is classified as a VFR airport. Therefore, only VFR minimums apply. Definitions for the weather conditions which affect Douglas Municipal Airport are listed below.

- VFR - Must maintain one mile visibility and remain clear of clouds.

- Below Minimums - Unable to remain clear of clouds or visibility is less than one mile.

2.7.3 Runway Wind Coverage

Wind direction and speed determine the desired alignment and configuration of the runway system. Aircraft land and take off into the wind and therefore can tolerate only limited crosswind components (the percentage of wind perpendicular to the runway centerline). The ability to land and take-off in crosswind conditions varies according to pilot proficiency and aircraft type.

An accurate analysis of wind data must be made in order to determine the orientation and number of runways. The FAA Advisory Circular 150/5300-13 recommends that a runway should yield a 95 percent wind coverage under stipulated crosswind components. If one runway does not meet this 95 percent coverage, then construction of an additional runway is necessary. The crosswind component of wind direction and velocity is the resultant vector which acts at a right angle to the runway. It is equal to the wind velocity multiplied by the trigonometric sine of the angle between the wind direction and the runway direction. The allowable crosswind component for each Airport Reference Code is shown in Table II-5.

TABLE II-5
ALLOWABLE CROSSWIND COMPONENT

Allowable Crosswind in Knots	Airport Reference Code
10.5 Knots	A-I & B-I
13 Knots	A-II & B-II
16 Knots	A-III, B-III, & C-I through D-III
20 Knots	A-IV through D-VI

Source: FAA AC 150/5300-13.

The nearest weather station to the Douglas Municipal Airport which records wind information is at Bisbee-Douglas International Airport (BDI), approximately 10 NM northwest. However, through discussions with airport management and users, it was found that wind conditions at these two airports vary considerably, even though they are relatively close in land distance. Therefore, it would be misleading to use wind data from BDI for Douglas Municipal Airport. The most recent Airport Layout Plan for Douglas Municipal Airport was completed in 1990, and used wind data obtained from Phelps-Dodge Corporation in Douglas and the weather station at BDI. This information is fairly outdated, consisting of data from 1948 through 1980. Phelps-Dodge was contacted for more recent weather information, but the company did not maintain those records after the Douglas plant closed in the late 1980's.

Because no accurate or recent wind data exists for the Douglas Municipal Airport, this Airport Master Plan will rely on information obtained from current airport users and airport management concerning wind conditions and trends for recommendations on a future crosswind runway orientation. However, it is suggested that an Automated Surface Observation System (ASOS) be installed at the airport immediately to begin collecting wind data for a minimum of 12 months so that the crosswind orientation may be verified prior to construction.

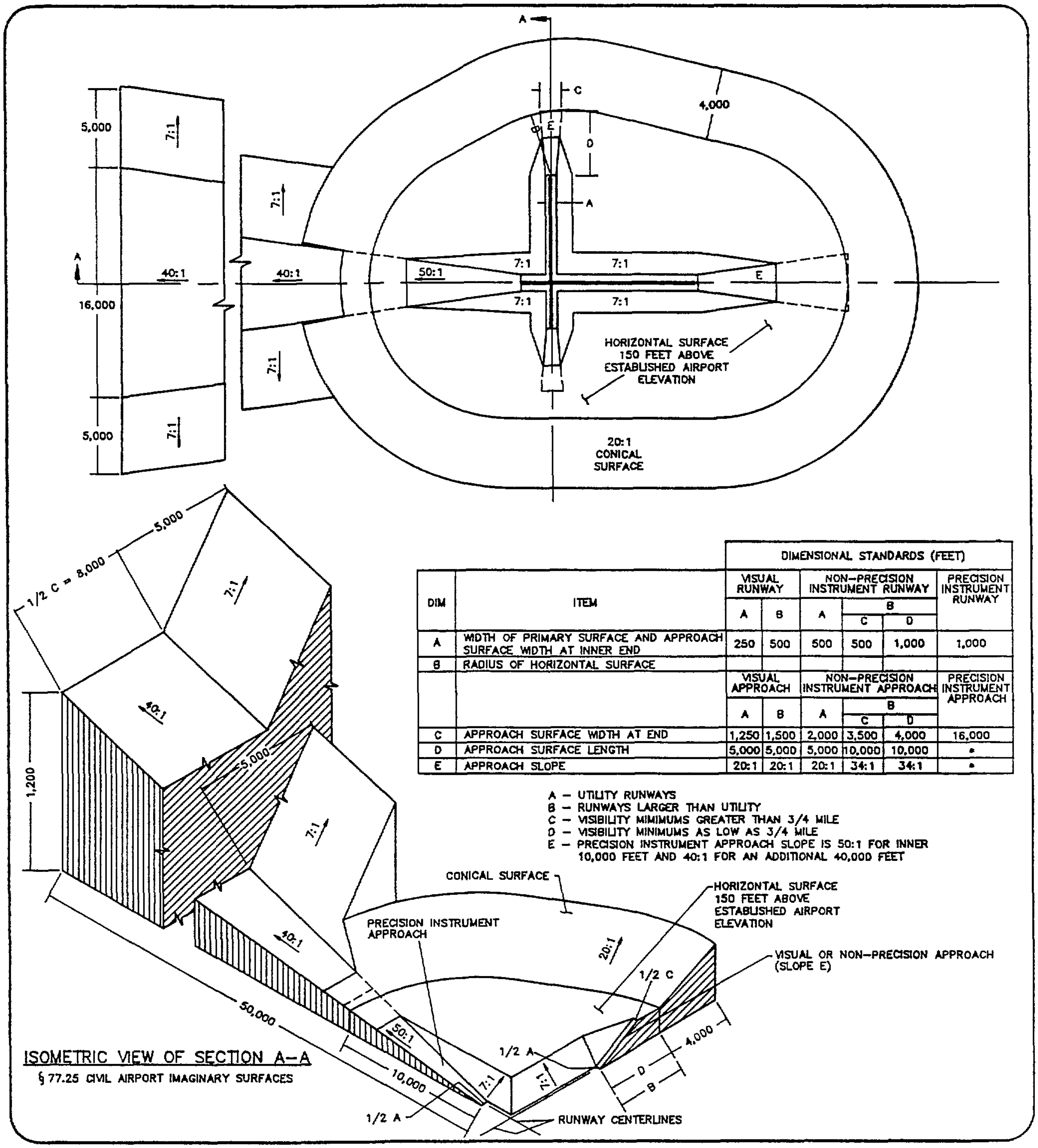
2.8 AIRPORT IMAGINARY SURFACES

Federal Aviation Regulations (FAR) Part 77 establishes several Imaginary Surfaces of varying dimensions that are used as a guide to provide a safe operating environment for aviation. These surfaces, which are typical for civilian airports, are shown in Figure 2-5. The Primary, Approach, Transitional, Horizontal, and Conical Surfaces identified in FAR Part 77 are applied to each runway at both existing and new airports on the basis of the type of approach procedure available or planned for that runway and the specific FAR Part 77 runway category criteria. For the purpose of this section, a utility runway is a runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight and less. A visual runway is a runway intended solely for the operation of aircraft using visual approach procedures, with no straight-in instrument approach procedure and no instrument designation indicated on an FAA approved airport layout plan, a military service approved military airport layout plan, or by any planning document submitted to the FAA by competent authority. A nonprecision instrument runway is a runway with an approved or planned straight-in instrument approach procedure which has no existing or planned precision instrument approach procedure. Runway 18/36 is classified as a utility runway with visual approaches. Runway 3/21 is a utility runway with visual approaches for existing and future conditions, and a nonprecision runway capable of accommodating large aircraft (those weighing more than 12,500 pounds) for ultimate conditions.

2.8.1 Primary Surface

The Primary Surface is an imaginary surface of specific width longitudinally centered on a runway. Primary Surfaces extend 200 feet beyond each end of the paved surface of runways, but do not extend past the end of non-paved runways. The elevation of any

FIGURE 2-5
IMAGINARY SURFACES
DOUGLAS MUNICIPAL AIRPORT



ISOMETRIC VIEW OF SECTION A-A

§ 77.25 CIVIL AIRPORT IMAGINARY SURFACES

DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
					B		
		A	B	A	C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE						
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
					B		
		A	B	A	C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A – UTILITY RUNWAYS
B – RUNWAYS LARGER THAN UTILITY
C – VISIBILITY MIMIMUMS GREATER THAN 3/4 MILE
D – VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
E – PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

point on the Primary Surface is the same as the elevation of the nearest point on the runway centerline. The existing and future width of the Primary Surface at Douglas Municipal Airport for Runway 3/21 is 250 feet, while the ultimate Primary Surface width is 500 feet (upon establishment of a nonprecision approach). The existing width of the Primary Surface for Runway 18/36 is 250 feet.

2.8.2 Approach Surface

The Approach Surface is a surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the Primary Surface. An Approach Surface is applied to each end of the runway based upon the type of approach available or planned for that runway. The inner edge of the surface is the same width as the Primary Surface. It expands uniformly to a width corresponding to the FAR Part 77 runway classification criteria.

The dimensions for the Approach Surfaces for both ends of Runway 18/36 measure 250 feet at their inner width, 1,250 feet in width at their outer limit, and extend for a horizontal distance of 5,000 feet. The approach slope angle is 20 to 1. The Approach Surfaces for both ends of Runway 3/21 for existing and future conditions have the same dimensions - 250 feet by 1,250 feet by 5,000 feet with a slope of 20 to 1. For ultimate conditions, however, the Approach Surface dimensions for Runway 3/21 are based on the establishment of a straight-in nonprecision approach to Runway 21 and the design aircraft group increasing to accommodate large aircraft. Therefore, Runway 21's Approach Surface will have an inner width of 500 feet, outer width of 3,500 feet, length of 10,000 feet, and a slope of 34 to 1. Runway 3's Approach Surface dimensions will measure 500 feet at the inner width, 1,500 feet at the outer width, 5,000 feet in length, and a slope of 20 to 1.

2.8.3 Transitional Surface

The Transitional Surface extends outward and upward at right angles to the runway centerline from the sides of the Primary and Approach Surfaces at a slope of 7:1 and ends at the Horizontal Surface.

2.8.4 Horizontal Surface

The Horizontal Surface is considered necessary for the safe and efficient operation of aircraft in the vicinity of an airport. As specified in FAR Part 77, the Horizontal Surface is a horizontal plane 150 feet above the established airport elevation. The perimeter is constructed by arcs of specified radius from the center of each end of the Primary Surface of each runway. The radius of each arc is 5,000 feet for runways designated as utility or visual and 10,000 feet for all other runways. The elevation of the Horizontal Surface at Douglas Municipal Airport is 4,323 feet MSL, while the radius of the arcs is 5,000 feet. However, when a nonprecision approach is established into Douglas Municipal Airport, the radius of the arcs will be 10,000 feet.

2.8.5 Conical Surface

The Conical Surface extends outward and upward from the periphery of the Horizontal Surface at a slope of 20:1 for a horizontal distance of 4,000 feet. The Conical Surface elevations at Douglas Municipal Airport are 4,323 feet MSL for the inner surface and 4,523 feet MSL for the outer surface.

2.9 OBJECTS AFFECTING NAVIGABLE AIRSPACE

The criteria for objects affecting navigable airspace (obstructions) contained in FAR Part 77 apply to existing and proposed manmade objects, and objects of natural growth and terrain. These criteria indicate the "critical" areas in the vicinity of airports which should be kept free of obstructions. "Secondary" areas may contain obstructions, if they are determined to be nonhazardous by an aeronautical study and if they are marked and lighted as specified in the aeronautical study determination. Airfield navigational aids or lighting and visual aids by nature of their location may constitute obstructions, but these objects do not violate FAR Part 77 requirements as they are essential to the operation of the airport.

"D" Hill, located approximately one mile east of the Douglas Municipal Airport, penetrates the Conical Surface. The remaining Part 77 Imaginary Surfaces are clear of any penetrations at this time.

2.10 RUNWAY & TAXIWAY STANDARDS

As previously discussed, the Airport Reference Coding (ARC) system is used to relate airport design criteria to the operational and physical characteristics of the critical aircraft intended to operate at the airport. The design or critical aircraft usually has the largest wingspan and the fastest approach speed. The design or critical aircraft must also have over 500 operations per year to be considered the design aircraft. As previously discussed, those aircraft weighing 12,500 pounds or less and having an ARC of B-II should be considered the existing and future design aircraft for Runway 3/21. The ultimate design aircraft will remain a B-II, but will consist of aircraft weighing less than 25,000 pounds. Runway 18/36's design aircraft group is a B-I weighing 12,500 pounds or less. Runway standards for Douglas Municipal Airport were developed by FAA guidelines to provide the airport operator with a selection of various widths, clearances and separations related to the critical aircraft design group and approach category for the airport.

2.10.1 Obstacle Free Zone (OFZ) and Object Free Area (OFA)

As established in FAA Advisory Circular 150/5300-13, Chapter 3, the OFZ is a three dimensional volume of airspace which supports the transition of ground to airborne aircraft operations. The clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible visual NAVAIDS that need to be located in the OFZ because of their function.

The Runway OFZ is similar to the FAR Part 77 Primary Surface insofar that it represents the volume of space longitudinally centered on the runway. It also extends 200 feet beyond the end of each runway. For the Douglas Municipal Airport, the width of the Runway OFZ for the existing and future design group of Runway 3/21 is 250 feet. The ultimate Runway OFZ width for Runway 3/21 will be 400 feet. The Runway OFZ width for Runway 18/36 is 250 feet. The OFZ's of Runway 3/21 and Runway 18/36 have no object penetrations.

The Runway Object Free Area (OFA) is a two dimensional ground area surrounding the runway. The runway OFA standard precludes parked airplanes, agricultural operations, and objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes. The OFA according to existing, future, and ultimate design group standards for Runway 3/21 is 500 feet in width and extends 600 feet beyond the runway ends. The width of the OFA for Runway 18/36 is 400 feet and extends 500 feet beyond the runway ends. The OFA of Runway 3/21 is penetrated by the perimeter fence off both ends, and also by an access road off the approach end of Runway 3. Runway 18's OFA is also penetrated by the perimeter fence, a city street, and the Geronimo trail off the approach end.

The partial parallel taxiway to Runway 3/21 has a Taxiway Object Free Area (TOFA) width of 131 feet for existing, future, and ultimate conditions. The TOFA width for Runway 18/36's parallel taxiway is 89 feet. The TOFA has no penetrations.

2.10.2 Runway Protection Zones (RPZ)

The RPZ is trapezoidal in shape and centered about the extended runway centerline. It begins 200 feet beyond the end of the area usable for takeoff or landing. Displacing the threshold does not change the beginning point of the RPZ. The RPZ dimensions are functions of the design aircraft, type of operation, and visibility minimums.

Runway 18/36 has Runway Protection Zones for aircraft which weigh 12,500 pounds or less. These Runway Protection Zone dimensions result in a trapezoid with an inner width of 250 feet extending to an outer width of 450 feet. The length of the RPZ is 1,000 feet. Runway 3/21's existing and future RPZs have the same dimensions of a 250 foot inner width, 450 foot outer width, and 1,000 foot length. When a nonprecision approach is established to Runway 21 (ultimate phase), its RPZ will have an inner width of 500 feet, outer width of 1,010 feet, and a length of 1,700 feet. Runway 3's RPZ at that time will have dimensions which measure 500 feet at the inner width, 700 feet at the outer width, and 1,000 feet for the length. Runway 3's inner RPZ is penetrated by the perimeter fence and the access road. Runway 21's and 18's RPZ's are also penetrated by the fence, and by a city street and the Geronimo trail. Runway 36's RPZ is penetrated by the fence.

While it is desirable to clear all objects from the RPZ, uses such as agricultural operations, provided they do not attract birds, and golf courses are normally acceptable. However, land uses which are prohibited from the RPZ include residences and places of public assembly, such as churches, schools, hospitals, office buildings, shopping centers, and other uses with similar concentrations of people.

2.10.3 Safety Areas

Runway and Taxiway Safety Areas are a defined surface surrounding the runway or taxiway prepared specifically to reduce the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway or taxiway. The Safety Areas must be:

- Cleared and graded and have no potentially hazardous surface variations;

- Drained so as to prevent water accumulation;

- Capable, under dry conditions, of supporting snow removal equipment, ARFF equipment and the occasional passage of aircraft without causing structural damage to the aircraft;

- Free of objects, except for objects that need to be located in the runway or taxiway safety area because of their function.

The Safety Area for Runway 18/36 is 120 feet wide and extends for 240 feet beyond the runway end. The existing, future, and ultimate Safety Area for Runway 3/21 is 150 feet wide and extends 300 feet beyond the runway ends. The Safety Area width for the parallel taxiway to Runway 18/36 at Douglas Municipal Airport is 49 feet, while it is 79 feet for the partial parallel taxiway to Runway 18/36. The Safety Areas of Runway 3/21 are graded and free of objects. Runway 18/36's Safety Areas do not meet standards due to rising terrain. The Taxiway Safety Areas are also graded and clear of objects.

2.11 LINE OF SIGHT

The FAA Advisory Circular 150/5300-13, Airport Design, sets guidelines for appropriate runway gradients to allow for adequate line of sight along the runway surface. These guidelines state that along individual runways, an acceptable runway profile permits any two points five feet above the runway centerline to be mutually visible for the entire runway length. A centerline profile was drawn for both runways at Douglas Municipal Airport, and the line of sight is acceptable according to FAA standards.

2.12 RUNWAY VISIBILITY ZONE

The Runway Visibility Zone for intersecting runways is an area formed by imaginary lines connecting the two runway's visibility points, as determined by specific criteria listed in FAA Advisory Circular (AC) 150/5300-13. Table II-6 provides this criteria.

TABLE II-6
RUNWAY VISIBILITY ZONE CRITERIA

If the distance from the intersection of two runway centerlines to a runway end is 750 feet (250 m) or less, the visibility point is on the centerline of the runway end.
If the distance from the intersection of two runway centerlines to a runway end is greater than 750 feet (250 m) but less than 1,500 feet (500 m), the visibility point is on the centerline, 750 feet (250 m) from the intersection of the runway centerlines.
If the distance from the intersection of two runway centerlines to a runway end is equal to or greater than 1,500 feet (500 m), the visibility point is on the centerline equidistant from the runway end and the intersection of the centerlines.

The RVZ will be established according to a new crosswind runway location (See Chapter V, Facility Requirements), and will be kept clear of objects and natural growth.

2.13 SUMMARY OF DIMENSIONAL CRITERIA

The following Table II-7 summarizes the recommended dimensional standards described above for the existing, future and ultimate conditions at Douglas Municipal Airport.

TABLE II-7
SUMMARY OF DIMENSIONAL CRITERIA
DOUGLAS MUNICIPAL AIRPORT

STANDARD	EXISTING DIMENSIONS	FUTURE DIMENSIONS	ULTIMATE DIMENSIONS	
Horizontal Surface				
Elevation	4,323 feet MSL	4,323 feet MSL	4,323 feet MSL	
Radius of arcs	5,000 feet	5,000 feet	10,000 feet	
Conical Surface				
Slope	20:1	20:1	20:1	
Inner elevation	4,323 feet MSL	4,323 feet MSL	4,323 feet MSL	
Outer elevation	4,523 feet MSL	4,523 feet MSL	4,523 feet MSL	
Transitional Surface - Slope	7:1	7:1	7:1	
PRIMARY RUNWAY STANDARDS (Utility/small aircraft for existing and future conditions, Nonprecision/large aircraft for ultimate conditions)				
Primary Surface				
Width	250 feet	250 feet	500 feet	
Length beyond runway end	200 feet	200 feet	200 feet	
Approach Surface	Runway 3/21	Runway 3/21	Runway 3	Runway 21
Inner width	250 feet	250 feet	500 feet	500 feet
Outer width	1,250 feet	1,250 feet	1,500 feet	3,500 feet
Length	5,000 feet	5,000 feet	5,000 feet	10,000 feet
Slope	20:1	20:1	20:1	34:1
Runway Obstacle Free Zone				
Width	250 feet	250 feet	400 feet	
Length beyond runway end	200 feet	200 feet	200 feet	
Runway Object Free Area				
Width	500 feet	500 feet	500 feet	
Length beyond runway end	600 feet	600 feet	600 feet	
Runway Protection Zone	Runway 3/21	Runway 3/21	Runway 3	Runway 21
Inner Width	250 feet	250 feet	500 feet	500 feet
Outer Width	450 feet	450 feet	700 feet	1,010 feet
Length	1,000 feet	1,000 feet	1,000 feet	1,700 feet
Runway Safety Area				
Width	150 feet	150 feet	150 feet	
Length beyond runway end	300 feet	300 feet	300 feet	

TABLE II-7 (continued)
SUMMARY OF DIMENSIONAL CRITERIA
DOUGLAS MUNICIPAL AIRPORT

CROSSWIND RUNWAY STANDARDS (Utility/small aircraft for existing, future, and ultimate conditions)			
Primary Surface Width Length beyond runway end	250 feet N/A if dirt runway 200 feet if paved runway	250 feet N/A if dirt runway 200 feet if paved runway	250 feet N/A if dirt runway 200 feet if paved runway
Approach Surface Inner width Outer width Length Slope	250 feet 1,250 feet 5,000 feet 20:1	250 feet 1,250 feet 5,000 feet 20:1	250 feet 1,250 feet 5,000 feet 20:1
Runway Obstacle Free Zone Width Length beyond runway end	250 feet 200 feet	250 feet 200 feet	250 feet 200 feet
Runway Object Free Area Width Length beyond runway end	400 feet 500 feet	400 feet 500 feet	400 feet 500 feet
Runway Protection Zone Inner Width Outer Width Length	250 feet 450 feet 1,000 feet	250 feet 450 feet 1,000 feet	250 feet 450 feet 1,000 feet
Runway Safety Area Width Length beyond runway end	120 feet 240 feet	120 feet 240 feet	120 feet 240 feet
PARALLEL TAXIWAY STANDARDS			
Taxiway Object Free Area Width - Primary Runway's parallel taxiway Width - Crosswind Runway's parallel taxiway	131 feet 89 feet	131 feet 89 feet	131 feet 89 feet
Taxiway Safety Area Width - Primary Runway's parallel taxiway Width - Crosswind Runway's parallel taxiway	79 feet 49 feet	79 feet 49 feet	79 feet 49 feet

Source: FAR Part 77 and FAA Advisory Circular 150/5300 -13, Airport Design